COLONY AND PROTECTORATE OF KENYA

# DEPARTMENT OF AGRICULTURE
# ANNUAL REPORT
# 1949

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# PART I—AGRICULTURE IN 1949

## WEATHER

A below-average and in many areas inadequate rainfall was the main theme of meteorological conditions for 1949. The long rains were late everywhere and it was the latter half of April before conditions were suitable for the planting of crops. Bad distribution of this meagre rainfall was a further hindrance to good production. Hail damage was experienced in parts of the Rift Valley and Nyanza Provinces. However, the harvesting of those crops that had been fortunate enough to reach maturity was carried out under ideal conditions. The short rains were late and their accompanying crops below average standard. The Coast Province was probably the worst sufferer during the year, while Nyanza Province seemed singularly fortunate and a record maize crop was harvested.

(*For the following detailed notes on weather conditions, together with Tables A and B, the Director of Agriculture is indebted to the Director of the East African Meteorological Department.*)

*Rift.*—Conditions were very dry from January to March and in October and November. A fairly wet June counterbalanced a rather dry May, and there were good rains in August and September.

*West Rift.*—Conditions were similar to those in the Rift Area, but with a drier June and July.

*East Rift.*—Dry conditions lasted until well into May; July, October and November rainfall was below average, and there was a deficit of over 20 per cent for the year as a whole.

*Trans Nzoia.*—January to March was dry, as was November, but good rains in September and December brought the annual totals almost up to normal.

*Nyanza.*—The most notable features were a dry period January to March and a wet December.

*Main Coffee Areas.*—Apart from almost average rainfall in April and August, conditions were drier than normal from January to November. December was wet, however, and the year as a whole was 40 per cent below average.

*Coast.*—It was a very dry year at the Coast, in many parts the driest this century, and the rainfall for the year was 45 per cent below average. The only months with rainfall above average were July and December.

## TABLE A

## RAINFALL OVER THE MAIN AGRICULTURAL AREAS OF KENYA—1949

| District | Rift | | West Rift | | East Rift | | Trans Nzoia | | Nyanza | | Main Coffee Areas | | Coast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Stations | 22 | | 12 | | 21 | | 23 | | 26 | | 27 | | 15 | |
| | Mean Fall 1949 | Ave. Fall | Mean Fall 1949 | Ave. Fall | Mean Fall 1949 | Ave. Fall | Mean Fall 1949 | Ave. Fall | Mean Fall 1949 | Ave. Fall | Mean Fall 1949 | Ave. Fall | Mean Fall 1949 | Ave. Fall |
| | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* | *In.* |
| January .. .. | 0·20 | 1·01 | 0·20 | 1·48 | 0·50 | 1·02 | 0·06 | 0·84 | 0·25 | 2·00 | 0·08 | 1·49 | 0·13 | 0·78 |
| February .. .. | 0·63 | 1·45 | 0·69 | 2·30 | 0·51 | 1·21 | 0·49 | 1·51 | 1·38 | 3·14 | 0·65 | 1·76 | 0·03 | 0·56 |
| March .. .. | 0·24 | 3·12 | 0·18 | 4·19 | 0·59 | 2·42 | 0·13 | 2·90 | 0·74 | 5·40 | 0·47 | 4·66 | 0·21 | 2·10 |
| April .. .. | 5·08 | 5·51 | 7·87 | 7·49 | 3·30 | 5·02 | 4·45 | 5·90 | 9·83 | 8·80 | 9·36 | 9·13 | 3·66 | 6·56 |
| May .. . | 3·85 | 4·99 | 5·25 | 6·30 | 3·10 | 3·86 | 7·27 | 6·47 | 6·97 | 9·58 | 2·00 | 5·60 | 4·13 | 13·44 |
| June .. .. | 3·83 | 3·34 | 4·85 | 4·68 | 2·79 | 2·43 | 4·40 | 4·94 | 5·62 | 5·71 | 0·44 | 1·69 | 1·96 | 5·13 |
| July .. .. | 4·17 | 4·33 | 4·46 | 5·56 | 2·90 | 3·88 | 6·81 | 6·16 | 5·87 | 4·85 | 0·26 | 0·69 | 5·22 | 2·94 |
| August .. .. | 5·20 | 4·40 | 6·97 | 6·19 | 4·31 | 3·80 | 6·96 | 6·56 | 6·54 | 6·21 | 0·84 | 0·87 | 1·83 | 2·67 |
| September .. .. | 3·18 | 2·61 | 5·33 | 3·67 | 2·37 | 1·77 | 7·21 | 3·92 | 7·08 | 5·56 | 0·53 | 1·12 | 2·21 | 2·57 |
| October .. .. | 1·46 | 2·22 | 1·12 | 3·20 | 1·11 | 2·18 | 2·13 | 2·81 | 3·86 | 4·10 | 0·43 | 2·88 | 0·94 | 2·99 |
| November .. .. | 1·04 | 2·68 | 1·80 | 3·79 | 1·35 | 3·14 | 0·82 | 2·35 | 2·54 | 4·64 | 2·37 | 5·80 | 1·29 | 2·74 |
| December .. .. | 2·03 | 1·65 | 3·13 | 2·32 | 2·19 | 1·78 | 1·80 | 0·90 | 4·94 | 3·06 | 5·45 | 3·36 | 3·30 | 2·64 |
| Year .. .. | 30·91 | 37·31 | 41·85 | 51·17 | 25·02 | 32·51 | 42·53 | 45·26 | 55·62 | 63·05 | 22·88 | 39·05 | 24·91 | 45·12 |

TABLE B

PERCENTAGE DEPARTURES

| | Rift | West Rift | East Rift | Trans Nzoia | Nyanza | Main Coffee Areas | Coast |
|---|---|---|---|---|---|---|---|
| January .. .. | —80 | —86 | —51 | —93 | —88 | —94 | —83 |
| February .. .. | —57 | —70 | —57 | —68 | —56 | —63 | —93 |
| March .. .. .. | —92 | —96 | —76 | —95 | —86 | —90 | —90 |
| April .. .. .. | —8 | +5 | —34 | —24 | +12 | +2 | —44 |
| May .. .. .. | —23 | —17 | —19 | +12 | —27 | —64 | —69 |
| June .. .. .. | +15 | +4 | +15 | —11 | —2 | —73 | —62 |
| July .. .. .. | —4 | —20 | —25 | +10 | +21 | —62 | +78 |
| August .. .. .. | +18 | +12 | +13 | +6 | +5 | —3 | —31 |
| September .. .. | +22 | +45 | +34 | +84 | +27 | —52 | —14 |
| October .. .. | —34 | —65 | —49 | —24 | —6 | —85 | —68 |
| November .. .. | —61 | —52 | —57 | —65 | —45 | —59 | —53 |
| December .. .. | +23 | +35 | +23 | +100 | +62 | +62 | +25 |
| YEAR .. .. .. | —17 | —18 | —23 | —6 | —12 | —41 | —45 |

## AGRICULTURAL EXPORTS IN 1949

The post-war years have shown an ever-increasing figure in the value of agricultural products exported annually from Kenya. Goods to the value of £9,635,894 indicate an increase of 9.7 per cent over the figure of £8,783,398 for 1948 and an even more impressive increase of 197 per cent over the 1939 figure of £3,242,475.

Sisal retained its place as the most valuable export commodity, both in quantity and monetary value showing a slight increase over the figures for 1948. Although coffee remains in second place, quantity and value are down compared with 1948 figures, by 45 per cent and 25 per cent respectively. Wattle bark extract and tea have interchanged, the former now occupying third place with a substantial increase over the previous year of 72 per cent in weight and 77 per cent in value.

Tea having fallen to fourth place presents an interesting picture of the changing world market prices, for though the quantity is down by 40 per cent the value has increased by 11 per cent.

Pyrethrum has made a spectacular climb from tenth to fifth place, the higher price offered making the monetary value increase of 220 per cent, far in advance of the meagre 37 per cent increase in quantity.

The sixth most valuable commodity exported from Kenya during 1949 was goat and kid skins (shade-dried) followed by hides of cattle (shade-dried), raw cotton, wheat flour and meal, wheat grain, butter, meat and preparations thereof (other than bacon, ham and pork) and so on, as can be seen in Table C.

An item of particular note is that of raw cotton, which is, of course, almost entirely produced by native growers. A large increase indeed can be seen over the 1948 figures and it is interesting to note that whereas the quantity exported is only 37 per cent of that exported in 1939, the monetary value is twice that of the 1939 exports.

The export of maize has dropped sharply and indicates the increased demand for home consumption, as a comparison with 1939 when there was a larger quantity of maize exported than any other commodity and it occupied fifth place in the list of values.

Meat and preparations thereof (other than bacon, ham and pork) have reached a high figure whereas previously they have merely been included under the heading Other Agricultural Produce. Bacon, ham and pork have nearly halved in exportable value. Sunflower seed continues on the increase as also do edible oils and fats.

These rising export figures coupled with the increased demands made by the home market for commodities of all kinds, are a clear indication of a substantial increase in productivity.

Table C gives the quantities and values of the major items of agricultural produce exported during the last five years and, for comparison, the corresponding figures for 1939.

## TABLE C

## DOMESTIC EXPORTS—KENYA, 1949*

| | Unit of Quantity | Quantity | Value |
|---|---|---|---|
| *Live animals, chiefly for food—* | | | £ |
| Bovine cattle | No. | — | — |
| Sheep and lambs | ,, | 71 | 75 |
| Goats and kids | ,, | 521 | 502 |
| Other animals (including poultry, etc.) | ,, | 786 | 128 |
| *Meat and preparations thereof—* | | | |
| Meat of swine (bacon, hams and pork) | Cwt. | 2,345 | 24,507 |
| Other meat and preparations thereof | ,, | 14,002 | 126,299 |
| *Dairy produce, eggs and honey—* | | | |
| Milk and cream fresh | Gal. | 279 | 29 |
| Milk (dried powder) | Cwt. | 202 | 2,948 |
| Butter (fresh or salted) including melted or clarified | ,, | 10,162 | 131,289 |
| Cheese | ,, | 107 | 1,053 |
| Eggs in the shell | Doz. | 54,158 | 5,490 |
| Natural honey | Cwt. | — | 1 |
| *Edible oils and fats—* | | | |
| Lard, not including neutral lard | ,, | 49 | 198 |
| Other animal oils, fats and greases | ,, | 620 | 2,233 |
| Cotton seed oil | ,, | 1,012 | 7,318 |
| Other edible oils and fats | ,, | 12,809 | 85,389 |
| *Cereals—* | | | |
| Wheat | ,, | 141,772 | 185,374 |
| Maize | ,, | 63,150 | 46,467 |
| Millets | ,, | 32,041 | 22,406 |
| Other cereals | ,, | 130 | 239 |
| *Manufactured products of cereals, principally for human food—* | | | |
| Meal and flour of wheat, spelt and meslin | ,, | 137,625 | 226,511 |
| Maize meal and flour | ,, | 47,146 | 37,182 |
| Meal and flour of other or mixed cereals | ,, | 66 | 197 |
| Other manufactured products of cereals | ,, | 373 | 1,374 |
| *Edible nuts except oil nuts—* | | | |
| Coco-nuts | ,, | 513 | 238 |
| Cashew nuts | ,, | 927 | 10,396 |
| *Vegetable roots and tubers, chiefly used for human food and their preparations, n.e.s.—* | | | |
| Potatoes, not including sweet potatoes | ,, | 49,837 | 32,654 |
| Other vegetables fresh or simply prepared in brine | ,, | 7,410 | 8,885 |
| Beans and peas | ,, | 9,607 | 17,136 |
| Pulses | ,, | 26,364 | 40,390 |
| Dhall | ,, | 13,429 | 41,775 |
| Other lentils and legumes | ,, | 2 | 3 |
| *Sugar, coffee, tea, etc.—* | | | |
| Sugar, not refined, in bulk | ,, | 3,707 | 4,508 |
| Jaggery | ,, | 1,591 | 1,989 |
| Coffee, not roasted | ,, | 156,300 | 1,509,836 |
| Tea | ,, | 53,009 | 716,641 |

* These figures are taken from the Annual Trade Report for 1949.

TABLE C—(*Contd.*)

DOMESTIC EXPORTS—KENYA, 1949

| | Unit of Quantity | Quantity | Value |
|---|---|---|---|
| | | | £ |
| *Passion fruit juice* | Imp. gal. | 25,602 | 13,408 |
| *Oilseeds, nuts and kernels*— | | | |
| Groundnuts | Tons | — | 4 |
| Copra | ,, | — | — |
| Soya beans | ,, | — | — |
| Cotton seed | ,, | 103 | 1,094 |
| Castor seed | ,, | 246 | 8,591 |
| Sunflower seed | ,, | 1,865 | 60,601 |
| Other oil seeds, nuts and kernels | ,, | 647 | 35,164 |
| *Beeswax* | Cwt. | 1,172 | 16,503 |
| *Wattle bark extract* | Cwt. | 439,721 | 888,841 |
| *Essential vegetable oils*— | | | |
| Lemon grass oil | Lb. | — | — |
| Bitter orange oil | ,, | — | — |
| Geranium oil | ,, | 6,908 | 12,270 |
| Other essential vegetable oils | ,, | 44,640 | 6,620 |
| Rubber, crude, plantation and wild | Cental of 100 lb. | 51,548 | 18,890 |
| *Hides and Skins*— | | | |
| Hides of Cattle sun-dried | Cwt. | 9,885 | 62,990 |
| shade-dried | ,, | 44,143 | 373,486 |
| Calfskins and kips sun-dried | ,, | 281 | 1,898 |
| shade-dried | ,, | 323 | 2,666 |
| Sheepskins and lambskins sun-dried | ,, | 2,074 | 17,371 |
| shade-dried | ,, | 9,400 | 94,817 |
| Goatskins and kidskins sun-dried | ,, | 4,271 | 82,221 |
| shade-dried | ,, | 16,635 | 513,796 |
| Other hides and skins | ,, | 1,597 | 16,755 |
| Sheep and lambs' wool | Cental of 100 lb. | 10,267 | 94,619 |
| Cotton raw | ,, | 22,246 | 248,374 |
| Flax | Tons | 103 | 15,408 |
| Sisal | ,, | 33,413 | 2,851,823 |
| Mangrove bark | ,, | 292 | 4,321 |
| Wattle bark | ,, | 5,915 | 111,157 |
| Pyrethrum | Cwt. | 76,506 | 604,620 |
| Papain | ,, | — | 1 |

TA

QUANTITIES AND VALUES OF CERTAIN AGRICULTURAL COMMO
1939 AND

| Commodities | Unit | Quan | | |
|---|---|---|---|---|
| | | 1939 | 1945 | 194 |
| **Animals Living:—** | | | | |
| Cattle | No. | — | — | |
| Sheep and Goats | ,, | — | 538 | 1 |
| **Animal Products:—** | | | | |
| Bacon and Ham | Cwt. | 1,376 | 2,954 | 4 |
| Beeswax | ,, | 1,208 | 399 | |
| Butter | ,, | 19,331 | 14,402 | 25 |
| Cheese | ,, | 652 | 213 | |
| Ghee | ,, | 1,946 | 2,305 | 1 |
| Hides (shade-dried) | ,, | 19,245 | 26,958 | 25 |
| Hides (sun-dried) | ,, | 21,737 | 8,037 | 8 |
| Skins (Sheep and Goats) (shade-dried) | No. | 337,082 | 355,771 | 864 |
| Skins (Sheep and Goats) (sun-dried) | ,, | 1,014,543 | 499,977 | 810 |
| Wool | Centals | 15,114 | 22 | 6 |
| **Crop Produce:—** | | | | |
| Coco-nuts and Copra | Tons | 215 | 40 | |
| Coffee | Cwt. | 338,125 | 149,297 | 193 |
| Cotton | Centals | 59,677 | 16,053 | 6 |
| Sisal | Tons | 29,163 | 28,531 | 24 |
| Flax | ,, | 16 | 646 | |
| Beans (including Soya beans) | Cwt. | 123,002 | 30,327 | 53 |
| Maize | ,, | 1,007,125 | 1,077,238 | 348 |
| Maize Meal and Flour | ,, | 112,029 | 16,583 | 82 |
| Pulses, other than Beans | ,, | 7,756 | 18,815 | 59 |
| Wheat | ,, | 973 | 210,179 | 33 |
| Wheat Flour | ,, | 63,883 | 120,010 | 192 |
| Grain, other than Maize and Wheat | ,, | 14,618 | 110,458 | 126 |
| Groundnuts | Tons | 402 | — | |
| Linseed | ,, | — | 1 | |
| Cashew Nuts | ,, | 32 | 25 | |
| Sesame | ,, | 1,283 | 3 | |
| Sunflower Seed | ,, | 477 | — | |
| Coco-nut Oil | Imp. gal. | 33,152 | 115 | |
| Essential Oils | ,, | 3,660 | 5,856 | 5 |
| Groundnut Oil | ,, | 6,233 | 20 | |
| Sesame Oil | ,, | 89,944 | 40 | |
| Potatoes | Cwt. | 173,046 | 117,920 | 95 |
| Pyrethrum | ,, | 55,628 | 108,187 | 148 |
| Sugar | ,, | 81,463 | 27,566 | 12 |
| Tea | ,, | 88,627 | 85,052 | 79 |
| Wattle Bark | ,, | 226,716 | 184,859 | 157 |
| Wattle Extract | ,, | 131,312 | 171,163 | 238 |
| Passion Fruit Juice | Imp. gal. | 22,744 | 5,042 | |
| **Other Agricultural Produce** | — | — | — | |
| **Total** | £ | | | |

BLE C

DITIES, THE PRODUCE OF KENYA, EXPORTED DURING THE YEARS 1945 TO 1948

| TITY | | | VALUE | | | | |
|---|---|---|---|---|---|---|---|
| 6 | 1947 | 1948 | 1939 | 1945 | 1946 | 1947 | 1948 |
| | | | £ | £ | £ | £ | £ |
| | 21 | — | — | — | — | 74 | — |
| 210 | 864 | 742 | — | 477 | 1,022 | 801 | 676 |
| 654 | 6,592 | 4,391 | 9,080 | 25,852 | 40,058 | 64,031 | 45,140 |
| 717 | 590 | 638 | 5,162 | 3,362 | 9,078 | 9,320 | 9,109 |
| 472 | 28,539 | 18,735 | 82,797 | 98,402 | 153,988 | 273,735 | 224,970 |
| 499 | 898 | 814 | 2,987 | 1,170 | 3,102 | 6,614 | 7,787 |
| 257 | 142 | 4 | 7,862 | 18,458 | 9,550 | 846 | 26 |
| 640 | 21,980 | 34,476 | 53,372 | 114,474 | 157,738 | 277,696 | 290,802 |
| 515 | 9,810 | 10,567 | 43,444 | 20,678 | 49,317 | 67,927 | 67,975 |
| 966 | 1,392,149 | 2,120,957 | 18,152 | 32,940 | 98,571 | 211,655 | 425,899 |
| 539 | 1,051,632 | 829,181 | 40,900 | 28,749 | 73,226 | 118,100 | 103,802 |
| 690 | 9,089 | 8,940 | 56,578 | 168 | 30,156 | 41,846 | 91,714 |
| 41 | 56 | 31 | 1,561 | 124 | 645 | 586 | 338 |
| 342 | 213,814 | 287,644 | 800,827 | 639,433 | 950,179 | 1,311,633 | 2,018,573 |
| 537 | 14,549 | 9,056 | 124,021 | 104,805 | 40,685 | 99,472 | 96,688 |
| 555 | 24,283 | 30,639 | 442,434 | 769,494 | 858,830 | 1,360,883 | 2,365,717 |
| 589 | 128 | 56 | 810 | 72,486 | 75,801 | 14,504 | 8,703 |
| 020 | 29,750 | 40,548 | 40,250 | 27,533 | 80,544 | 45,378 | 55,518 |
| 245 | 1,248,802 | 272,152 | 222,037 | 458,294 | 155,796 | 671,730 | 176,780 |
| 737 | 114,377 | 125,416 | 25,450 | 7,207 | 37,275 | 76,760 | 127,374 |
| 011 | 176,208 | 85,887 | 2,702 | 26,130 | 112,121 | 363,084 | 167,038 |
| 815 | 328,242 | 128,125 | 393 | 166,319 | 27,351 | 285,449 | 143,157 |
| 676 | 166,088 | 177,239 | 50,655 | 153,950 | 233,205 | 216,314 | 273,969 |
| 590 | 70,702 | 114,162 | 4,424 | 97,532 | 121,360 | 50,815 | 91,211 |
| — | — | 65 | 4,442 | — | 9 | 2 | 2,060 |
| 1 | 5 | — | 5 | 14 | 17 | 319 | — |
| 74 | 59 | 69 | 1,812 | 7,534 | 22,513 | 13,952 | 13,549 |
| 1 | — | — | 14,499 | 84 | 20 | 3 | — |
| 75 | 86 | 828 | 3,997 | 1 | 1,043 | 1,829 | 26,747 |
| — | 1,012 | 411 | 2,346 | 29 | — | 257 | 103 |
| 698 | 5,671 | 4,100 | 4,956 | 17,074 | 21,332 | 17,675 | 7,270 |
| 300 | 64 | 75 | 680 | 8 | 78 | 17 | 24 |
| 106 | 758 | 884 | 10,008 | 14 | 28 | 207 | 276 |
| 511 | 54,898 | 33,762 | 29,199 | 62,007 | 46,549 | 29,681 | 20,008 |
| 855 | 34,583 | 29,395 | 357,170 | 792,895 | 1,156,402 | 271,999 | 188,622 |
| 729 | 29,053 | 10,754 | 50,308 | 27,521 | 14,464 | 31,621 | 12,683 |
| 920 | 85,588 | 53,089 | 501,732 | 532,447 | 534,240 | 907,079 | 642,484 |
| 030 | 205,007 | 229,560 | 72,846 | 89,448 | 78,135 | 132,924 | 191,073 |
| 923 | 231,789 | 254,710 | 91,438 | 165,103 | 253,350 | 313,685 | 501,080 |
| 527 | 9,511 | 29,432 | 6,713 | 1,685 | 2,233 | 4,366 | 13,763 |
| — | — | — | 54,446 | 156,314 | 172,117 | 294,799 | 370,690 |
| | | | 3,242,475 | 4,720,215 | 5,622,128 | 7,589,578 | 8,783,398 |

## CROPS

*Barley.*—There was an appreciable increase in the acreage planted to barley, there being 20,071 acres in 1949 compared with 13,102 acres the previous year. The total yield increase from 82,688 bags to 118,176 bags was due only to the greater acreage because the average yield per acre dropped from 6.31 to 5.88 bags per acre (of 180 lb. each).

The average price to the producer for malting barley was Sh. 35/75 (including bag) which was an increase of Sh. 8/50 over the previous year, whilst Grade 1 feed barley rose slightly to Sh. 20/75 per 180-lb. bag, including bag.

*Cashew Nuts.*—There was a reduction from last year's figure of 983½ tons to a total of 789 tons. The price remained at ten cents per pound to the producers who received £8,837 for the crop.

*Cassava.*—Five thousand, five hundred and eighty-three bags of 125 lb. each of the dried product were delivered to Control. This represented more than twice the amount offered during 1948. The vast majority of this commodity is consumed on the *shamba* where it is grown and the grower is being encouraged to increase his acreage as a safeguard against famine and locust invasion; also the demand for dried cassava (tapioca) to be exported to the United Kingdom has increased the price at railhead to five or six cents per pound payable to the grower, and this will help to establish cassava as a cash crop.

*Chillies.*—The quantity of this commodity sold to Control was rather less than during the previous year. 4,700 frasilas (of 36 lb. each) realized to the producers a total sum of £6,000.

*Coffee.*—Although the year brought record coffee prices it was a disappointing one from a purely productive viewpoint. Drought conditions were widely prevalent and much of the crop was light and drought-affected, though a few estates in Kiambu, Solai, Songhor and Nandi districts produced five Class I coffees. For the 1948–1949 season the acreage can only be estimated at 60,000 acres. Production amounted to 6,562 tons of clean coffee valued at £1,090,280, after deducting all charges, compared with 14,075 tons worth £2,197,137 during the previous season. The average production per acre was 2.23 cwt. The average payout to growers was Sh. 161/25 per hundredweight with Sh. 208/38 being paid for Class I produce.

African producers in Central Province numbered 2,236 and covered 532 acres; sales realized £6,221, but when considering this figure it must be remembered that not all the area has yet reached the producing stage.

In South Nyanza 220 acres were under coffee and yielded well. Nurseries were started in North Nyanza where it is intended to introduce this crop on the slopes of Mount Elgon.

*Copra.*—The increased price of Sh. 10/85 compared with the previous price of Sh. 9/40 per frasila (of 36 lb.) was probably one of the reasons why the amount of copra offered to Control rose by approximately 1,000 tons over the 1948 figure, to a total of 1,744 tons. The value of this amount was £50,000 which is a considerable increase over the £21,300 for the previous year.

*Cotton.*—By increasing the price of seed cotton 50 per cent and bringing it up to 30 cents a pound (first quality) payable to grower, coupled with much propaganda from the field officers concerned, the total number of bales produced in 1949 was exactly double the number produced in 1948. Of the total, amounting to 9,714 bales, 7,267 were produced in Nyanza and 2,447 in Coast Province. 5,561 bales were exported from the Colony at a total value of £248,374.

The rather dry conditions resulted in a good-quality product. In Nyanza, earlier and better sowing was emphasized and rain in August and September greatly improved growth, but continued rain tended to retard the crop and increase the incidence of Blackarm. Attack by *Lygus* was slight. In South Nyanza a substantial increase in acreage was achieved. Seed storage and distribution

was for the first time organized by Marketing Officers. At the Coast, increased acreages were cleared for planting, but low germination and lack of rain combined to make the resultant output somewhat disappointing.

*Essential Oils.*—1949 saw an end to the decline in value of essential oils and the total figure of £18,890 was an impressive increase over the previous year's figure of £7,270. It should be noted that whereas 6,908 lb. of geranium oil realized £12,270, the larger quantity of 44,640 lb. of other essential oils only brought in £6,620. In other words, geranium oil was worth approximately Sh. 36 per pound while other essential oils were worth approximately Sh. 3 per pound.

*Flax.*—The production of flax has not varied to any great extent. Fifty tons of fibre were sold at £180 per ton which was £25 a ton above the previous year's price. Thirty-three tons of tow fetched £59 a ton.

*Ground-nuts.*—The number of bags offered to Control remained steady at 17,003 bags of 180 lb. each. The producer was paid Sh. 32/40 per bag (not including cost of bag) at 18 cents per pound. Much seed was distributed to the growers in Nyanza Province, but unfortunately it was almost entirely used as food and did not find its way into the ground. This crop is being encouraged to a great extent in the reserves, not only because of its cash and food value but also because of its value as a rotation crop.

*Kapok.*—The price increase to 35 cents per pound payable to the producer over the 30 cents per pound offered during the two previous years, provided the incentive to raise the amount produced from 33,397 pounds to 88,712 pounds.

*Linseed.*—The acreage under this crop increased to 8,099 acres mainly on account of its usefulness as a rotation crop, its relatively high price and the added inducement to stockowners of having the linseed cake returned after oil extraction. Unfortunately, yields were disappointing and an average of only 1.67 bags per acre was recorded.

*Maize.*—The 1949 non-native crop yielded 1,154,793 bags (of 200 lb.) from 133,164 acres. The average yield came to 7.77 bags per acre. In Nakuru district the average was 7.47 bags per acre and in the Trans Nzoia District it was 8.95 bags per acre. These compare favourably with the overall average for 1948 of 7.81 bags per acre.

Deliveries to Control were as follows:—

| | *1948/49* *Bags* | *1947/48* *Bags* |
|---|---|---|
| Non-native areas .. .. | 639,356 | 395,471 |
| Native areas .. .. .. | 1,015,302 | 668,194 |
| | 1,654,658 | 1,063,665 |

Of the 1,015,302 bags sold during 1949 in native areas, approximately half that amount came from North Nyanza alone, where an extremely good crop was grown. In most native areas the standard of cultivation is improving; sowing in rows on contours, as well as cutting and stooking at harvest time, are now common practices. Propaganda is aimed at higher yields from smaller acreages, and a cessation of the monoculture of maize with its consequent impoverishment of the soil. Increased maize production in the native reserves must be obtained by better farming methods and not by an increased acreage under the crop.

*Oats.*—Once again an increased acreage under oats may be recorded. 107,689 bags (of 150 lb.) were reaped from 15,519 acres which gave an average of 6.93 bags per acre, a slight improvement on the previous year's average of 6.48 bags per acre. The quality was the best for several years and resulted in a good percentage of the crop being sold for milling at the price of Sh. 22/75 per bag (including bag) whilst feeding oats fetched from Sh. 20/75 to Sh. 11/75 depending on the grade. A considerable acreage was grown for use as cattle forage, either in the form of hay, silage or to be grazed.

*Other Cereals.*—The following quantities of other cereals were bought by Control from native areas during 1949:—

| | |
|---|---|
| Sorghum (*Mtama*) .. .. .. .. | 21,074 bags |
| Millet (Finger, i.e. *Wimbe*) .. .. .. | 18,140 bags |
| Millet (Bulrush and Foxtail) .. .. .. | 36,808 bags |

These figures represent no great change from the previous year. It is difficult to estimate exactly how much is actually grown as the African producer retains considerable quantities for food and beer-making purposes.

*Papain.*—This was an uneconomical proposition during 1949 and growers sold their pawpaws as fresh fruit to local markets.

*Passion Fruit.*—The number of gallons of juice produced remained fairly steady at 27,450 gallons. It should be remembered that one gallon of juice is obtained from 425 lb. of fruit so that the actual quantity of fruit grown is considerable. The price paid to growers dropped from 11.3 cents to 10.146 cents per pound of fruit. The number of licensed growers dropped by two to leave a total of 29. Almost the entire product was exported at a value of £13,408, only 1,935 gallons being consumed in the Colony. The early drought caused some woodiness and brown spot disease.

*Potatoes.*—The quantity of potatoes sold from Central Province, the main source of supply, was twice that of the preceding year, the actual figure being 11,710 tons. Contributory factors to the increase were firstly the availability of blight-resistant varieties and secondly the absence of the usual cold, dull period after the long rains which reduced the incidence of blight. 2,491 tons were exported from the Colony at a total value of £32,654.

*Pulses.*—Sales from Central Province were reduced by about 33½ per cent, the quantity and value being 4,360 tons and £98,731 respectively. Deliveries to Control were:—

| | |
|---|---|
| Beans, various .. .. .. .. .. | 2,500 tons |
| Field peas .. .. .. .. .. .. | 738 tons |
| Cowpeas, gram and others .. .. .. .. | 2,898 tons |

The majority of pulses grown in African areas are consumed by the producers. The increase in price offered to the grower in 1950 will, no doubt, increase the acreage planted and by this, it is hoped, in addition to providing a local surplus for labour rations, to discourage the excessive planting of cereals in favour of leguminous crops and thereby introduce a more balanced rotation.

*Pyrethrum.*—With the rise in price, the acreage under this crop, which was declining rapidly, has tended to increase but not to the extent of previous years. Only 15,339 acres were estimated to be bearing; the number of licensed growers was but 460 and not all these delivered flowers to the Board. The price payable for first grade was Sh. 1/85 per pound of dried flowers; in all 1,581 tons were produced, being 74 tons more than during 1948. The large amount of pyrethrum exported during 1949 was a result of stocks having been held pending a suitable market and altogether 3,825 tons left the Colony valued at £604,620. Some pyrethrum was grown by individual Africans in the Kiambu district and 5,414 pounds valued at £270 were delivered to the Board. With the approval of the Pyrethrum Board, planned extension of this acreage is proposed at the higher elevations and the crop should become a useful sideline to the mixed farming policy in the African areas.

*Rice.*—Although the acreage under this crop in Nyanza Province increased slightly, bad weather conditions and complete lack of rain at the critical mid-growth period resulted in very poor average yields of one-quarter of a ton of unhulled rice per acre in North Nyanza. In Central Nyanza where nearly all the rice is transplanted from seed beds into irrigated paddies, good results were obtained and an average yield of one ton per acre over 700 acres was experienced. But the total figure of 1,577 tons produced was a disappointing drop when compared with the previous year when 2,800 tons were marketed. The 1,577 tons

were valued at £21,132; 819 tons were delivered to Control and the remainder went to local mills. At the Coast much of the crop was so badly droughted that it produced little or nothing.

*Sisal.*—In spite of the price increase to Sh. 125 per hundredweight for top-grade sisal compared with Sh. 84 during 1948, a small acreage was under production, the actual figure being 225,387 acres. From this, 36,021 tons were produced of which 33,413 tons were exported valued at £2,851,823; these three figures are all slightly above the corresponding ones for the previous year.

*Sugar.*—Production for the 12 months ended 30th November, 1949, amounted to 11,274 tons of refined sugar compared with 12,784 tons in the previous 12 months and 9,171 tons in 1947. The acreage dropped slightly from 13,289 acres to 12,468 acres. One hundred and eighty-five tons of sugar were exported, valued at £4,508.

*Sunflower.*—Both acreage and yield per acre have increased. Fourteen thousand, seven hundred and seventy-six acres were planted in Rift Valley Province which is the main producing area. One thousand, eight hundred and sixty-five tons of sunflower seeds were exported during the year at a value of £60,601, a substantial increase over the previous year's figures of 828 tons and £26,747 respectively.

The dwarf varieties are becoming popular and in trials out-yielded the Giant Black; the chief problem still remains that of mechanical harvesting; combining has met with only limited success. Apart from the tonnage exported, considerable quantities were kept for stockfeed and for seed for green manure crops.

*Tea.*—Tea growers had a fairly good year apart from the temporary effect of early dry weather and a little hail damage. Nevertheless, production has not returned to the 1947 peak of 13,384,000 pounds of tea. The poor weather conditions of 1948 resulted in a production of 10,200,000 pounds in that year and in 1949 11,457,626 pounds. Of this, 5,937,008 pounds were exported during the calendar year valued at £716,641 and 7,622,495 pounds were consumed locally. The total acreage planted was 17,765 acres of which 15,256 acres were mature tea. A region above Karatina on the slopes of Mount Kenya was agreed upon as a site for African-grown tea, but no plantings have yet taken place.

*Tobacco.*—A considerable increase in flue-cured tobacco was recorded, 1,830,387 pounds green leaf valued at £4,266 were disposed of from Central Province compared with 931,024 pounds during the previous year. Native-cured tobacco amounted to 342,819 pounds, worth £16,194; this was sent all over the country and was largely used for manufacture into snuff. The Coast Province production figures were down by two-thirds, amounting to only 10,000 pounds with a cash return of £500. Initial trials were started in the Machakos area and it is hoped to interest the local population in the crop.

*Vegetables, Fruit and Flowers.*—In Central Province the lack of an organized marketing organization for the disposal of fresh produce is a very discouraging factor from the growers' point of view. Nevertheless, vegetables, fruit and flowers valued at £113,949 were sold during the year. In Kiambu increased plantings of pine-apples have taken place; 38,220 pounds of Tuso plums were sold; 1,177 boxes of strawberries and 4,112 boxes of other fruit left the Machakos district.

In the Coast Province sales of fruit and vegetables realized some £100,000 during the year, but in spite of efforts to extend the types and varieties of vegetables grown in the Teita Hills the more easily produced cabbage and carrot remained well to the fore.

*Wattle.*—The main Rift Valley Province producing area of Uasin Gishu increased its acreage during the year by approximately 13,000 acres due to plantings by individual farmers and of the East African Tanning Extract Company estates. The new Eldoret factory has been working to capacity since it was opened

during the year and 9,455 tons of bark have been processed. The industry continues to prosper in Central Province and is by far the greatest revenue producer; 1949 sales amounted to 39,826 tons valued at £415,710. The total purchases from all sources during the year were 48,094 tons, valued at £487,505.

*Wheat.*—An extremely good year for wheat production was experienced. The acreage increased slightly from 199,073 to 224,695 acres in non-native areas, but the harvest produced 1,207,817 bags (of 200 lb. each) as compared with the previous year's figure of 1,041,402 bags. The average yield per acre rose from 5.09 bags to 5.37 bags. Local flour consumption amounted to 442,544 bags. The newly released variety from the Plant Breeding Station—294M—gave high yields in all areas. Wheat continues to be grown in limited African areas, most of the product being consumed locally.

## LIVESTOCK PRODUCE

*Bacon and Lard.*—Deliveries of pigs during 1949 comprised 27,097 baconers and 2,331 larders, compared with 19,806 baconers and 2,093 larders in 1948. Exports of bacon and ham during the year amounted to 2,345 hundredweights valued at £24,507 compared with 4,391 hundredweights at £45,140 during the previous year. Twelve thousand four hundred and ninety porkers were slaughtered for the internal market.

*Butter.*—The creameries produced 5,872,166 pounds of butter of which 4,658,458 pounds were consumed locally, leaving 1,138,144 pounds for export at a value of £131,289. The total production figure remained steady but local consumption was almost double that of 1948 and resulted in a drop in exportable butter. The payout per pound of butterfat was Sh. 2/30 until 1st November when it rose to Sh. 2/45.

*Cheese.*—The total production figure of 404,902 pounds was almost as high as the previous year but local consumption rose sharply and only 11,984 pounds valued at £1,053 were exported as compared with 91,168 pounds valued at £7,787 during 1948.

*Clarified Butter.*—Production from native sources rose slightly but non-native production dropped considerably. Comparative figures were:—

| | *1948* | *1949* |
|---|---|---|
| | *Lb.* | *Lb.* |
| Native .. .. .. .. | 627,444 | 671,112 |
| Non-native .. .. .. .. | 86,137 | 32,954 |

All was consumed locally.

*Eggs.*—Controlled marketing of eggs continued in Nyanza Province. Sales in 1949 amounted to 403,220 dozen with a cash return of £21,180. Fifty-four thousand one hundred and fifty-eight dozen were exported, worth £5,490.

*Poultry.*—Sales from Central and Nyanza Provinces in 1949 amounted to 284,239 head valued at £38,259, compared with 388,347 head worth £55,067 during the previous year.

*Hides and Skins.*—Exports during the year were:—

| | *Cwt.* | *Value* |
|---|---|---|
| | | *£* |
| Hides (shade-dried) .. .. .. | 44,143 | 373,486 |
| Hides (sun-dried) .. .. .. | 9,885 | 62,990 |
| Skins (shade-dried) .. .. .. | 26,358 | 611,279 |
| Skins (sun-dried) .. .. .. | 6,626 | 101,490 |

Apart from the export figures, many hides and skins were tanned and processed in the Colony. It is difficult even to estimate the numbers and value, but as an example, one commercial firm alone handled 108,511 hides and skins, worth £30,305.

*Slaughter Stock.*—The following are the figures for livestock bought for slaughter by the Meat Marketing Board during the years 1948 and 1949:—

| | *1948* | *1949* |
|---|---|---|
| European cattle, including calves .. | 22,768 | 28,328 |
| Native cattle .. .. .. .. | 44,528 | 49,229 |
| European sheep and lambs .. .. | 22,851 | 30,853 |
| Native sheep and goats .. .. | 127,722 | 100,978 |

*Wool.*—The quantity exported in 1949 was 10,267 centals (of 100 lb.) valued at £94,619 compared with 8,940 centals and £91,714 during 1948, the increased value being proportionately less than the increased quantity.

*Livestock Population.*—The following figures show the estimated livestock population at the end of 1949:—

| | |
|---|---|
| *European Farms*— | |
| Cattle, pedigree .. .. .. .. .. | 5,941 |
| Cattle, grade and native .. .. .. .. | 583,371 |
| Sheep (woolled) .. .. .. .. .. | 263,180 |
| Pigs .. .. .. .. .. .. .. | 44,516 |
| Poultry .. .. .. .. .. .. .. | 253,234 |
| *Native Areas*— | |
| Cattle .. .. .. .. .. .. .. | 4,500,000 |
| Sheep and Goats .. .. .. .. .. | 6,000,000 |

## PRODUCTION IN NATIVE AREAS

With the exception of Nyanza Province and those native areas in the Rift Valley Province served by the July–August rains, the season was one of the poorest for many years. In the Central Province the April rains, although heavy, were of short duration and insufficient to bring crops through to maturity. The short rains were late in starting and, although heavy, were again of short duration, which adversely affected crop yields. In the Coast Province similar conditions prevailed and it was only on the coastal strip that there was sufficient rain to bring a poor main season crop and an even poorer short season crop to maturity. In the Central Province food reserves, built up during 1947 and maintained during 1948, were exhausted and importations of relief food became necessary, mainly in the districts of Machakos and Nyeri. In the Coast Province some 80,000 bags of cereals were imported and sold to alleviate the food shortage.

In Nyanza Province the season was one of the most productive on record and the lateness of the main rains, which resulted in poor crops in the Central and Coast Provinces, had a converse effect in Nyanza, in that it allowed extra time for soil preparation resulting in increased acreages which, with the July–August lake rains following, gave satisfactory yields. With increasing maize prices, maize monoculture continued to dominate the Kipsigis Reserve and parts of North and South Nyanza, with the resultant unbalanced farming.

Cash crops maintained their popularity and overall figures for the Colony showed interesting increases in production during the year. Rice production in Nyanza increased by about one-third; coffee remained the same; cotton production was doubled in Nyanza but unfortunately halved at the Coast due to adverse weather conditions. Tobacco remained steady in Central Province but wattle bark experienced a slight decline. Preliminary work for increasing the area under coffee in the reserves was carried out and it is hoped that pyrethrum will also soon be a recognized crop in African areas.

Table D gives figures for the three provinces of the more important crops and animal products. These, of course, represent the surplus marketed after the requirements of the producer have been met, and in most cases are but a small fraction of the total productions. Only crops marketed through the Maize and Produce Control, or which undergo produce inspection, are susceptible of accurate recording, others such as vegetables, fruit, etc., can only be estimated.

## TABLE D

## QUANTITIES AND VALUES OF MORE IMPORTANT PRODUCTS MARKETED (PARTLY ESTIMATED)

| | Unit | Nyanza Province | | Central Province | | Coast Province | |
|---|---|---|---|---|---|---|---|
| | | Quantity | Value | Quantity | Value | Quantity | Value |
| | | | £ | | £ | | £ |
| Maize and Maize Meal | 200 lb. | 807,430 | 452,161 | 68,570 | 50,620 | 15,600 | 14,000 |
| Millets and Sorghum | 200 ,, | 28,750 | 19,212 | 36,345 | 33,144 | — | — |
| Wheat | 200 ,, | 1,165 | 1,337 | 644 | 742 | — | — |
| Rice (Paddy) | 150 ,, | 23,520 | 21,132 | — | — | 10,666 | 20,000 |
| Pulses | 200 ,, | 8,624 | — | 54,264 | 98,731 | 12,000 | 26,000 |
| Potatoes | 180 ,, | 1,568 | 915 | 145,731 | 103,313 | — | — |
| Cashew Nuts | Cwt. | — | — | — | — | 14,886 | 8,500 |
| Cassava | 125 lb. | 3,190 | 995 | — | — | 5,376 | 2,400 |
| Chillies | Cwt. | — | — | — | — | 1,510 | 6,000 |
| Coffee Parchment | ,, | 378 | 2,595 | 483 | 4,952 | — | — |
| Coffee Buni | ,, | 81 | | 264 | 1,269 | — | — |
| Cotton (Seed Cotton) | 100 lb. | 96,320 | 130,486 | — | — | 32,021 | 45,000 |
| Cotton (Lint) | 400 ,, | 7,267 | | — | — | 2,447 | |
| Copra | Tons | — | — | — | — | 1,744 | 50,000 |
| Groundnuts | 180 lb | 15,394 | 20,704 | — | — | — | — |
| Sesame | 180 ,, | 958 | 1,552 | — | — | — | — |
| Tobacco, Green Leaf | lb. | — | — | 1,830,387 | 4,266 | — | — |
| Tobacco, Native Cured | ,, | — | — | 342,819 | 16,194 | 10,000 | 500 |
| Vegetables, Flowers and Fruit | — | — | — | — | 113,949 | — | 100,000 |
| Wattle Bark | Tons | — | — | 39,826 | 415,710 | — | — |
| Ghee | 36 lb. | 18,084 | 28,210 | 558 | 1,648 | — | — |
| Eggs | Gross | 32,685 | 21,180 | 55,429 | 46,343 | — | — |
| Poultry | Hds. | 19,988 | — | 264,251 | 36,259 | — | — |
| Fuel, Poles, Charcoal | — | — | — | — | 88,802 | — | — |
| Hides | 36 lb. | — | — | 28,782 | 49,756 | — | |
| Skins | Score | — | — | 20,757 | 61,308 | — | — |
| Miraa | Tons | — | — | 15,756 | 16,682 | — | — |
| Beeswax | 36 lb. | — | — | 1,652 | 6,752 | — | — |
| Kapok | 36 ,, | — | — | — | — | 88,808 | 1,700 |

# PART II—POLICY AND WORK OF THE DEPARTMENT OF AGRICULTURE

## GENERAL

A real appreciation of the past serious deterioration of the fertility of our land has been more apparent during the past year in both native and non-native land units.

It is pleasing to be able to record that the farming community of all races are making a determined effort to remedy the errors of the past, but the progress of the majority is still being retarded by a persistent minority who place their own interests before that of the land. As stated in the last report, if our task is to be accomplished, it is essential to obtain the wholehearted co-operation and good will of the entire farming community—there is no place in the agricultural policy for the laggard. In the African land units the problem of land tenure is of fundamental importance if satisfactory progress is to be achieved. It would be unwise to be too optimistic at this juncture but it is gratifying to be able to record that there are significant signs that the Africans themselves are alive to this problem and are making determined efforts to overcome it. If their efforts develop to the degree of practical application, then the whole agricultural problem in these land units can be considered in a different and more progressive perspective.

Farming progress in the Kenya Highlands is ahead of scientific knowledge and as such may result in serious repercussions. It is therefore with regret that I have to report that further delays in obtaining finance and staff have prevented the initiation of the Department's extended investigational programme during the year under review. These increased services, especially in so far as investigation into pasture management is concerned, are of vital importance to the future of our agricultural policy and in consequence it is considered that they should be afforded the highest priority. On proper land management rests the future economic and social prosperity of this Colony and without adequate knowledge this cannot be implemented.

## DEPARTMENTAL

Whilst there has been some improvement in the field staff position during the year, the recruitment of specialist staff has shown no change. As a result, the few specialist officers available in the Department have had to work at high pressure to keep pace with the many calls made on them and much that should be undertaken has had to be left in abeyance. In the European areas both the field officers and officers of the Soil Conservation Service have continued to make excellent progress in their work on farm planning and improved agricultural practices and have enjoyed the fullest co-operation of the farming community. In African areas the response to advice from departmental officers has been no less heartening and in some districts practically all cultivated lands are now subjected to some form of soil control measures. Much still remains to be done but the year has been one of steady progress.

## EXPERIMENTAL WORK

### Cereals

*Wheat.*—Breeding work, aiming at the production of improved types with particular reference to disease resistance, is centred at the Plant Breeding Station, Njoro, with sub-stations at altitudes varying from 5,700 to 9,300 feet for the purpose of testing performance at varying heights. Eight physiologic forms of the most important disease, black stem rust (*Puccinia graminis tritici*), are already known to occur in wheat in Kenya, and the appearance of a ninth form is suspected as a result of observations this year.

Three new wheats, Kenya Settler, Kenya Ploughman and 291 J Mark II, which have been bred at the Plant Breeding Station and are highly disease resistant, were released to farmers for sowing in 1950. Eight other varieties were increased by farmers under departmental control during the season, but will require further multiplication and testing before release. At the Plant Breeding Station selected material from three crosses has reached fixity and will be put into multiplication plots in 1950, while a number of other crosses are in the F2 or F3 generation. Of a large number of importations grown for the first time in 1948, 13 were planted for the second time, the majority having been discarded owing to susceptibility to disease, poor milling qualities, etc. In 1949 a further considerable number of importations from Southern Rhodesia, Northern Rhodesia, South Africa, Egypt and Canada, were grown for the first time.

*Barley.*—Research, a two-row variety from Australia, which was released to farmers in 1948, continued to yield well on a field scale. It is of good malting quality and resistant to yellow rust, and is undoubtedly a valuable addition to Kenya's barleys. Glacier, a six-row barley from the United States released for planting in 1949, is proving a useful feeding barley for lower elevations but appears susceptible to yellow rust over about 7,000 feet. A six-row variety received from Southern Rhodesia under the name of Canadian Mariout has been released to farmers for planting in 1950, as trials have indicated that it will be a good, strong-strawed feed barley for lower altitudes. A large number of new importations are undergoing trial and selection.

*Oats.*—The variety Achilles, from New Zealand, has, under further tests, been found to possess no advantages over Lampton, which is the standard variety for hay and feed, and multiplication of the former has therefore been abandoned. Seventeen varieties from America, Canada and Southern Rhodesia, which have been under trial, were all more or less severely attacked by stem rust, and are probably too susceptible to this disease for cultivation in Kenya. Sunrise, a new importation from Southern Rhodesia, did well in its first test and will be grown again next year.

*Maize.*—The appointment of a second plant breeder has allowed of a hybrid maize programme being restarted. Single crosses were made between inbred lines selected from those produced before staff shortages during the war interrupted the original programme, and these single crosses will be used to synthesize double hybrids in 1950. A new programme of inbreeding has been started, using both varieties and strains selected in Kenya, and also, in order to obtain genetic diversity, imported maizes from America, South Africa and Southern Rhodesia. Inbreds and hybrids from the same three territories are also under trial, but, while these may contain characteristics which will be of value in the breeding programme, the indications are that imported hybrids will be unsuccessful in Kenya. Work on maize improvement by S. C. Harland's intra-genotypic method is also proceeding.

*Sorghum.*—A start has been made with a breeding programme aiming at the production of dwarf varieties suitable for combine-harvesting, which would be valuable under drier conditions and on poorer soils than those suited to maize. A large number of imported dwarf and semi-dwarf varieties which were under trial appear to be too susceptible to local pests and diseases, and hybridization will be undertaken to combine their dwarf factor with the disease resistance of taller local varieties.

**Coffee**

The whole of the coffee research team is now concentrated at Ruiru, where the completed laboratories and administrative buildings were opened by His Excellency the Governor, Sir Philip Mitchell, on 10th December, 1949. The main station also carries out experimental work on sub-stations at Kitale, Elgon, Kiambu and Makuyu.

The entomological section has continued work on mealy bug, leaf miner, Antestia and thrips, and has begun a study of the use of persistent insecticides, such as B.H.C. and D.D.T., on coffee, with particular reference to their effects on measures of biological control.

Results of great interest are beginning to be obtained from the Agricultural Chemist's investigations of the influence of mulching, weed control and cultivation on soil structure and moisture relationships and from his experiments on the value of fertilizer and manurial dressings to coffee. It is already evident that it is more effective to use the limited amount of herbage available in the drier areas as mulch than as compost. Mulching has marked beneficial effects on the penetration of rainfall and retention of soil moisture and in lowering surface soil temperature, whereas under bare soil compost in economic doses is rendered relatively ineffective owing to the very rapid oxidation of organic matter and to the limitation of root activity early in the dry season by loss of soil moisture. In a complex cultivation trial clean weeding, by reducing the competition for moisture, has so far given significantly higher yields than slashing weeds or weeding only at the end of the rains. Growth of weeds during the rainy season has given striking increases in water percolation and root aeration but this has been obtained at the expense of crop yield, whereas the decline in structure on clean weeded plots over three years has not yet reached the point of decreasing yields. Cultivation with a hoe has given better yields than the use of a disc harrow or plough, the superiority of the former being due to its greater efficiency in the destruction of weeds rather than to any harmful effects of the latter in cutting roots, which is not apparent under dry conditions where the six-inch surface layer of soil is dry for much of the year. Depth of tillage, sub-soiling, and the application of *boma* manure (an inferior type of farmyard manure obtained from native cattle owners and often containing 75 per cent of earth), have so far had no effect on yield.

In a factorial trial comparing varying levels of application of nitrogenous and phosphatic fertilizers and of compost, only nitrogen at the higher rate of application so far shows any sign of increasing yield. In view of the three unusually dry seasons experienced since the beginning of the trial, crop yields have almost certainly been determined mainly by soil moisture supplies. In a subsidiary experiment comparing higher rates of application of nitrogen as sulphate of ammonia and ammonium nitrate, both applied to the soil and as a spray, it was found that, even under the dry conditions obtaining in the area, the extra nitrogen depressed crop yield except where readily available nitrate was sprayed on to the leaves while there was still enough moisture available for its use.

The Plant Pathologist/Physiologist has continued his investigations of the mode of action of the so-called "tonic" copper sprays and has confirmed the previous finding that there is an apparently fungicidal action which reduces leaf fall and the amount of weak spotting and promotes longer leaf life, but is not specifically due to copper since it is also obtained by the use of non-copper sprays, such as lime sulphur and Tulisan. It has been observed, however, that the yields over two years, admittedly from trees which have yet to bear a normal-sized crop, have shown little effect from any type of spray, and, furthermore, that the greatest density of foliage, and deepest green leaf colour, are associated with copper. It will, therefore, be necessary to continue the experiment in order to determine whether the effect of copper spraying on yield which has been observed in practice may be due to some further effect than the apparently fungicidal one. A careful examination of the structure of "weak" or "yellow" spots was made in view of the possibility that they may be connected with reduction in leaf life and with leaf fall. By the use of special staining techniques fungal hyphæ were demonstrated penetrating the centre of the spots, which are thus undoubtedly of fungal origin, but attempts to isolate the fungus from the deep infected tissues of the spots were unsuccessful.

An investigation of the causes of onion taint in coffee was carried out and at the same time some data on the effects of type of water, over-ripeness, frequent washings and estate of origin on liquoring quality were obtained. Individually these factors had remarkably small effects, but additively they were of commercial significance. Onion taint was found to be a fault inherent in the coffee as it comes from the plantation, but its production may be encouraged by under-water fermentation or frequent washings during fermentation.

Other work at the Coffee Research Station included continuation of growth and soil moisture records, a preliminary investigation into methods of measuring transpiration in coffee, investigation into methods of coffee preparation and experiments on pruning, picking and shade trees.

**Fruit**

At the main horticultural station, Molo, observational trials are being carried out with a number of varieties of apples, pears, peaches and plums on various root stocks, with soft fruits and with vegetables. Sub-stations are being developed at Ol Joro Orok, particularly for the comparison of tree fruits with and without irrigation, at Matuga, in the Coast Province, for sub-tropical fruits, and at the Coffee Research Station, Ruiru.

Further experiments were undertaken with the use of oil sprays for breaking prolonged dormancy in deciduous fruit trees in order to compare different sprays and to determine the best time of spraying various species. A chlorosis and necrosis of the leaves of deciduous fruit trees, which is particularly widespread in apple orchards in Kenya, was eliminated by ground application or spraying of magnesium sulphate and accentuated by application of sulphate of potash. Successful results have been obtained with Gravenstein apple grafted on to Malling stocks Nos. XIII, Immune 10, Immune 12 and Immune 411. Immune 10 and 12, which are by far the easiest to propagate, are being multiplied for issue to local nurserymen. Nursery material is being prepared for an apple rootstock and variety trial in which various varieties will be tested on Seedling Crab, Northern Spy, Cape Seedling and Malling Immune 10 and 12. A satisfactory method of drying Keiffer pears, with inexpensive equipment on the farm, was worked out and resulted in an attractive product of good flavour which should form a useful outlet in seasons when there is a surplus. Work has begun on the improvement of strawberry stocks, which are extremely poor in Kenya. The virus-free strain of Royal Sovereign, M.40, imported from England, is very promising at higher altitudes but less successful below 7,000 feet, and is susceptible to Strawberry Leaf Spot. It is proposed to cross Royal Sovereign with Melba, an Australian variety suitable for lower altitudes, and practically immune to Leaf Spot, but of poor flavour. Seedlings of two American hybrid strawberries have been raised with a view to trial and selection.

**Pasture**

Work continued on a survey of the nature, extent and distribution of the main plant communities of the Colony in order to obtain information on the major ecological zones and to provide a basis for regional pasture research.

Experiments on the management and improvement of natural grasslands have given the following results: (1) In the *Acacia-Themeda* grassland, at Ngong, the dominant, *Themeda triandra,* has been maintained by annual burning and suppressed by exclusion of fire, both with and without grazing treatments. (2) In an area transitional between the true Highland Grassland and *Acacia-Themeda* zones, near Thomson's Falls, a trial designed to discover methods of suppressing the useless coarse grass phase dominated by *Pennisetum schimperi* (which tends to replace the desirable *Themeda* herbage), confirmed that the coarse grass phase can be controlled by periodic burning of herbage protected from grazing, but the answer to the problem in this area should lie in an intensification of management, probably with the use of leys. (3) Marked reduction of *Aristida adsceniones,* an annual grass of low value which has tended to invade the *Cynodon* (Star Grass)

pastures of the old lake beds in the Rift Valley, has been obtained by permanent or deferred grazing with cattle, by burning or by exclusion of grazing, but continuance of permanent grazing with sheep has maintained the *Aristida*.

Work on the selection and testing of grasses suitable for ley establishment has already resulted in the commercial production and use of seed of three species, *Chloris gayana* (the Nzoia strain of Rhodes grass), *Bromus marginatus* and *Melinus minutiflora* (Molasses grass), one or other of which can be used in any of the crop-producing areas. Five other, indigenous, grasses have shown promise and have reached the stage of bulking for further work: *Pennisetum stramineum, Cenchrus ciliaris* (erect form), *Setaria* (?) *sphacelata*, the Chania River ecotype of Molasses grass, and the Alego strain of *Chloris gayana*, the last being a very vigorous and leafy type, but somewhat lacking in seeding qualities. Amongst a number of exotic grasses under trial, cocksfoot shows promise at the higher altitudes and merits further trial, and Kentucky 31 has done well at medium and high elevations. Trials of numerous species of indigenous legumes are in progress and two which show promise are *Alysicarpus glumaceus* and *Indigofera retroflexa*.

**Potatoes**

The blight-resistant potato varieties previously multiplied and now grown commercially, namely 914 *a* (12), 1082 *a* (28) and 1095 *b* (22), have yielded well and proved popular, but whereas they were not attacked by blight up to 1948, the advent of another form of the pathogen resulted in their showing some blight this season, although they still gave good yields. Further stocks of 914 *a* (12) and 1427 *a* (8) have been imported and are being multiplied in isolation at high altitude.

**Pyrethrum**

Considerable attention is being given to breeding improved strains of pyrethrum combining high yield of flowers, high pyrethrin content and erect habit, and suitable for varying altitudes. During 1949 there were 170 single plant selections undergoing trial and 35 crosses between selections were being tested in yield trials. Two strains, 188 x 194 and 188 x 214, are at a more advanced stage and seed of these crosses is being produced from plots of bulked clonal material. Both give good yields of flowers and have over 2 per cent total pyrethrins but are probably primarily suited to lower altitudes. Mass selected material from a particularly high-yielding plot is being bulked under the name "1970 control", and this strain is expected to be suitable for higher altitudes. Examination of analytical data for flowers produced at different elevations has revealed a significant positive correlation between pyrethrin content and altitude.

Investigations of bud disease, attributed to the fungus *Ramularia bellunensis*, at the Molo and Ol Joro Orok stations, showed that, with the relatively low incidence of the disease experienced, there was a significant negative correlation between disease incidence and yield only over the three-month "flush" period of flower production from late July to October, and not over the whole season. The pyrethrin content of diseased flowers is markedly reduced; badly diseased buds do not develop and are therefore not picked. Spraying with Shirlan, Tulisan, Spersul or Perenox had no effect on the disease, but the experiment requires repetition in view of the low incidence of the disease on both sprayed and unsprayed plots. Cutting back the plants at different times between 1st February and 30th June had no effect on disease incidence, but somewhat higher disease rates were observed where cutting back was done between July and January or where plants were not cut back at all.

Other work included a complex rotation trial, investigation of the causes of poor germination of Kenya pyrethrum seed and trial of manganese and magnesium on pyrethrum. Chemical work was mainly devoted to a study of analytical methods of estimating pyrethrins and of the depreciation in pyrethrin content of flowers in transit.

### Sisal

Following upon the old-established cutting and spacing trials at the Station itself, from which no new indications were obtained during the year, a study of the management of sisal is being undertaken by five complex field experiments planted in 1948 and 1949 on estates under varying conditions of soil and climate, and covering the four factors of plant density, spacing, time of first cut and interval between cuts. A planting methods trial, comparing nursery plants produced from bulbils with suckers from old and new areas, together with deep and shallow planting, was established in April, 1949, and so far is indicating only that deep planting produces fewer, but larger, leaves than shallow planting. Experiments on the manuring and mulching of nurseries were begun. Analyses of soil and leaves from areas where sisal leaf tip dieback occurred showed low contents of calcium and phosphorus and a field trial to test the effect of application of lime and phosphate was therefore laid down in an affected area. Various rates of application of potash for the correction of "banding" disease are under trial. Analyses of sisal waste have indicated the very large quantities of nutrients removed from the soil by this crop and underlined the need for work on fertility maintenance.

## SCOTT AGRICULTURAL LABORATORIES

### Chemical Section

Work on the relative availability of different kinds of phosphatic fertilizers continued to be the main line of investigation. Previous pot experiments had shown that the "early availability", as determined by the uptake of phosphate during 18 days' growth of cereal seedlings, of high-grade soda phosphate and superphosphate was about equal, while that of Uganda rock phosphate was appreciably less. In 1949 the uptake of phosphate from the same three materials, and their effect on growth, was determined by growing a sequence of cereal seedlings and grass in larger containers containing 45 pounds of soil of 12-inch depth, and also in a field experiment seeded to Rhodes grass after broadcasting the fertilizers and mixing them with the surface soil. The latter trial is intended to continue over several years, but in the current season results are available from a first cut of grass made five weeks after sowing and from an aftermath cut after six months. In all observations from both experiments it was found that plots receiving phosphate made markedly better growth than the controls and that Uganda rock phosphate was less available than the other fertilizers. The uptake of phosphate from triple-superphosphate and soda phosphate was similar in all observations except in the grass cut after six months, which showed an appreciably higher uptake from soda phosphate. In a third pot trial, equivalent amounts of phosphates as soda phosphates and triple-superphosphate were applied to wheat, place (*a*) in the row, (*b*) between the rows, and (*c*) between alternate rows, and phosphate uptake was determined after 19 and 40 days' growth by analysis of alternate seedlings. There were no significant differences between placements but again there was a marked response to phosphate and uptake from soda phosphate was equal to that from superphosphate after 19 days and greater after 40 days.

From these, and earlier experiments, there is therefore strong evidence that the "early" uptake of essential nutrient from mainly "citric-soluble" sodaphosphate is about the same as for mainly "water-soluble" superphosphate and triple superphosphate, while sodaphosphate has a relatively greater "later" availability. Thus it might be expected that, over a season's growth, sodaphosphate would be a very suitable fertilizer to use on many local soils which readily fix added water soluble phosphate, but many statistical field experiments with cereals, using a similar ribbon placement for both sodaphosphate and superphosphate have shown that the response was definitely less with sodaphosphate. A pot culture trial using varying soil-fertilizer ratios with the two fertilizers showed that at lower fertilizer concentrations uptake was greater with sodaphosphate but with increasing concentrations there was a steady fall in uptake from sodaphosphate while uptake

from superphosphate continued to increase up to the highest concentration used. These results suggest that when sodaphosphate is given as a locally concentrated ribbon application under field conditions the contained free sodium carbonate, and to a lesser extent the basic nature of sodaphosphate, result in alkaline conditions in the zone of enriched soil with a consequent lower availability of the fertilizer. The observations also offer a possible explanation of several instances where field trials showed a smaller absolute response from double dressings than from single dressings of this material.

Preliminary work on the seasonal supply of available soil nitrogen has included the estimation of the quantities of nitrogen reaching the soil in rainwater and the determination of the seasonal ammoniacal and nitrate nitrogen contents of soils under six different vegetal covers.

**Entomological Section**

Investigations were continued on the maize stalk borer (*Busseola fusca*) and on the bionomics and control of chafer grub (*Schizonycha sp.*), which is a serious pest attacking a number of crops in the Trans Nzoia. The latter is adequately controlled by soil treatment with B.H.C. but the amount of insecticide required is too costly for application on a large scale. More information was collected on the range of insects affecting stored products and experiments were carried out on the value of pyrethrum powder, B.H.C. and D.D.T. to protect maize in storage. These materials all had a measure of effectiveness, but do not give adequate protection at the doses commonly used and application with a bag probe and pressure gun fails owing to uneven distribution.

Further attempts to find means of controlling prickly pear with modern weed killers failed to produce any more effective method than the already known one of spraying with D.N.O.C. and digging out the stumps. The use of B.H.C. smoke produced from smoke generators in a special high-pressure applicator proved a promising means of termite control and experiments with it are continuing. The insect causing "Jacaranda Blight", *Orthezia insignis*, proved resistant to a number of insecticides used against it. B.H.C. has been found to be an effective substitute for arsenic in baits against a number of insects including wattle weevil or dusty ground beetle (*Dasus simplex*), army worm (*Laphygma exempta*), and fruit flies, although for the last mentioned a nicotine sulphate bait was more effective.

**Plant Pathology Section**

A very large proportion of the Senior Plant Pathologist's time is occupied with the identification of diseased specimens and general advisory work, with the testing of wheat varieties for disease resistance, particularly stem rust, and with the work on blight resistant potatoes, which has already been mentioned. Research on the *Monochætia* canker disease of *Cupressus*, referred to in the last annual report, has now been taken over by the East African Agricultural and Forestry Organization. Investigation of the pyrethrum bud disease, *Ramularia bellunensis*, has continued, but the disease, although widespread, was not serious. The presumed bacterial disease of maize, referred to in the 1948 Report, was again prevalent in the Trans Nzoia: it has not yet been possible to investigate it adequately but it appears to resemble that caused by *Pseudomonas alboprecipitans* in America. Details of the large number of diseases on a wide range of hosts which have received attention during the year are given in the report of the Senior Plant Pathologist in Volume 2 of this Report.

At the seed testing laboratory, also under the control of the Senior Plant Pathologist, investigations on the germination of seeds of pyrethrum and *Urena lobata* were undertaken in addition to routine work. Pre-chilling had a depressing effect on pyrethrum germination, and speed of germination was improved by low temperature without pre-chilling but reduced by high temperature. The most effective treatment for seeds of *Urena lobata* was immersion in boiling water which was then left to cool, followed by sun-drying and immediate sowing.

### Plant Breeding Station, Njoro

The work of the Senior Plant Breeder on cereals and pyrethrum has already been mentioned. Further trials at Njoro, Rongai, Kitale and Ol Joro Orok with the semi-dwarf varieties of sunflower, Mars, Jupiter and Pole Star, in comparison with the standard tall variety, Giant Black, have shown that with closer spacing the semi-dwarfs may outyield Giant Black. Twenty-six varieties of soya beans were under trial for the second season and again gave poor results.

Full details of all experimental work will be found in Volume II of this Report.

### Extension Work

The extension work of the Department has been mainly directed both in European and African areas towards the introduction of conservative systems of farming designed to maintain the fertility of the soil, and to develop economic farming systems on a sound and lasting basis. It should be stressed that such problems as maintenance of fertility on arable lands or veldt management on ranching lands are basically the same for both areas, and although methods of implementation must of necessity vary, the programme for all extension work must be determined from results obtained by sound experimentation and investigation.

In the European areas the main propaganda has been directed, in those areas where climatic conditions and rainfall are suitable, to the introduction of a system of farming based on alternate husbandry in which the temporary grass ley plays its part in the maintenance of soil fertility. In order that mechanical aids to soil conservation may play their full part in improved systems of farming, a start was made in all districts with the planning of whole farms, or groups of farms, on a land use basis—Agricultural Officers and Assistant Soil Conservation Officers working in close collaboration in this matter. A considerable demand exists amongst farmers to have their farms planned, but progress has had to be slow due to lack of staff and also the fact that planned farms will need constant visits and advice after the initial step has been taken; it is considered better, in the first instance, to concentrate on a few farms in the various areas and, as they develop, allow them to be a demonstration to others. In addition to the large numbers of visits made by officers to farms on advisory work, a number of Farmers' Days were organized, both on experimental stations and on farms, and an exhibit staged depicting a planned farm and dealing in detail with its agronomic and economic aspects at the Royal Agricultural Society of Kenya's Show at Nakuru.

The development of the "group farming" system in the Nyanza Province entered its second phase during the year, and the work of re-allocation of fragmental family holdings within the boundaries of the group was attempted. This essential step was not appreciated by many of the members of group farms on their formation and, with the exception of the Kericho district, difficulties in land tenure are yet to be overcome. Nevertheless, much progress has been made in rationalizing the use of "grouped" land, and a further development will probably be the registering of group farms as co-operative societies in which case they will be able to obtain loans for development purposes. An interesting experiment was commenced in North Nyanza where loans were granted to six approved farmers for development purposes. The use of Agricultural Betterment funds to finance such works as dam construction, land reclamation, purchase and running of ploughing units and for subsidizing the purchase of carts, wheelbarrows and fencing wire, is playing a large part in the improvement of agriculture in the African areas, more especially Nyanza, where large sums of money have accrued to district funds through cess on produce exported.

The individualists of the Central Province continue to look askance at group farming, and here increasing progress is being made with individual holdings on improved farming methods. Holdings are being fenced and paddocked

and the value of grass as a crop is becoming more appreciated. In the use of manure also progress is reported, to quote from the report of the S.A.A.O., South Nyeri:—

> "In Othaya location of Nyeri district the new Chief reports, and this has been confirmed, that no cattle owner is without a cattle shed. These cattle sheds are not mere ornaments in the countryside built to placate our officers but are being used for the making of very considerable quantities of manure, the value of which is now generally recognized."

In both the European and African areas, despite the progress that has been made it cannot be said that the deterioration in soil fertility has been arrested, much less any leeway made up. This will not come about until there is a marked change in production as between crop and animal products, in favour of the latter. With high cereal prices encouraging the continuance of land mining, and with the many problems to be solved in connexion with pastures and their economical conversion into animal products, not the least of which is the provision of a suitable animal for this purpose in the varying climatic zones; the work of extension officers putting over propaganda in favour of more balanced farming has been difficult, especially when it is considered that its adoption in the first instance means a reduced cash return per acre, although this will be fully offset by increased yields in after years.

**Soil Conservation Service**

The Service was strengthened by an increase in staff and the addition of many items of urgently needed equipment. In the European farming areas operations were carried out on 140 holdings. The existing units are quite unable to comply with all the demands for their services, with the result that some applicants may have to wait three or four years. There is no doubt that the value of the Soil Conservation Service is being appreciated by an ever-increasing number of farmers. Priority is given where soil conservation measures form part of the comprehensive farming plan, although in order to maintain land in production, individual areas are also treated. Land drainage problems were investigated, particularly the adoption of ridge and furrow treatment to dispose of surface water. The facilities for a full investigation of drainage problems are at present very limited.

The service given in the Native areas was mainly directed towards general improvement in agricultural practices. Terracing, except on group farms, or larger holdings, must be done by hand labour. Commercial labour has been used for this work. The maintenance of terraces requires continual supervision and encouragement; far too many miles of terraces, once constructed, are abandoned to their fate. There is a tendency to rely on grass filter strips set out on the contour, rather than to construct terraces; in many instances it is found that this grass land does not reduce the run-off of water to any great extent, although it at least has the advantage of encouraging cultivation to conform to the contours. The rehabilitation of eroded grazing areas received much attention and is attained by closing the areas and encouraging the planting of stoloniferous grass.

The Dam Construction service was improved by the creation of a second unit. The services of both units have been in great demand. The original unit has been employed in Native areas in Machakos throughout the year. The new unit was employed in European areas. The big demand for estimates for dams, which have subequently proved too expensive for the farmer, has prevented the Survey Team from keeping sufficiently ahead of the construction unit; in consequence good planning has been hindered.

The administration of the Inspection service was transferred to the Field service side of the Department, the Inspectors working with and under the District Agricultural Officer. The Inspectors are concerned with the implementation of The Land and Water Preservation Rules, as opposed to advising on or providing remedial measures. Soil Conservation officers—advisory, operational and inspectorate—work as a team with the Field service officers.

The staff position was strengthened by the appointment of a Soil Conservation Engineer, and a full complement of Assistant Soil Conservation Officers. It has not been possible to fill the vacancy for a qualified Soil Conservation Officer or those for Surveyors. In the Native areas additional Assistant Agricultural Officers have been recruited, but lack of housing has prevented the full establishment being attained.

The establishment of the sixth and last Soil Conservation Service Headquarters at Ruiru has started. The demand for mechanical service in this area is not likely to be great, although the planning services and those of the Surveyors are in great demand. Inspection services are also very necessary in this area.

Fair progress has been made with the building programme in both European and Native areas, but the very high cost of building, the curb placed on capital expenditure and the lack of sufficient skilled artisans, has prevented the full programme being carried out. A start was made at the new Nakuru District Headquarters, where some African housing was nearing completion by the end of the year. It was decided to concentrate on permanent housing in the Native areas.

There was a marked improvement in the availability of tractors and machinery and each mechanical unit is now adequately equipped, commensurate with the availability of trained staff to supervise and handle the equipment.

## EDUCATION

### Egerton School of Agriculture

Further development was made with buildings both in the tuition and hostel blocks and on the farm. The first Diploma Course was started with 14 students, and the fourth Certificate Course was attended by 23 students. Shortage of staff prevented full development of the Diploma Course. Short "Refresher" courses were again organized and proved very popular. Short Specialist courses were also organized. Students completing the Certificate Course had no difficulty in finding employment as farm managers; the demand for their services far exceeded the possible supply. The School farm was organized to give practical experience in every phase and branch of farming.

### Native Areas

In the Native areas the new buildings at the Embu School came into use in July. The transition from the old to the new school created difficulties, but the full course was achieved by using some of the old buildings and other expedients; 59 pupils attended the course. In the Coast Province, Kibarani School was attended by 21 pupils. In Nyanza Province, the old Bukura Training Centre was in process of development as a farming Training Centre for African farmers and their families. The process of training recruit Instructors was maintained there pending transfer of this activity to the combined training centre at Siriba. There were 50 trainee Instructors on the course at the end of the year.

The increase in the number of European officers made it possible to give more attention to the Missionary and Education Department schools, where demonstrations and practical instruction towards better farming methods have produced notable results.

### Grading, Inspection and Cool Storage Service, Mombasa

There was a greatly increased demand on the Inspection service in respect of both exports and imports.

The Grading services were mainly concerned with beans, potatoes, chillies and capsicum. The last two items were graded under the 1948 rules, which were brought into force in February, 1949. These rules were amended later in the year, relaxing the standard required for export. No maize was graded for export, though a small quantity was handled for the Maize and Produce Control.

The Conditioning Plant handled a smaller quantity of produce than in the previous year owing to a fall in production due to drought. A great improvement was made in the economic operation of this plant by fitting steam traps. Fumigation chambers were mainly used for treating seed beans.

The Cool Store closed down in April, 1949, its function being taken over by the new Cool Store erected by the Railway authorities. The plant was dismantled, awaiting disposal.

Financially, the operations of the Inspection, Grading and Conditioning organization at Mombasa showed a considerable loss. This was due to the very small volume of maize handled, while the overheads in the way of staff and maintenance could not be correspondingly reduced. It is anticipated that the position will be greatly improved in 1950.

**Produce Marketing and Inspection**

The value of organized marketing, coupled with Inspection services, is everywhere apparent. A high standard is being maintained through close co-operation between the Inspectorate and Produce Control staff.

The planning and laying out of markets continues to receive careful attention; a system of payment by Produce Control direct to the grower tended to cut out the ubiquitous middleman to the benefit of the producer.

In Nyanza Province, rice buying came under Produce Control for the first time. Inspectors and Traders were instructed in proper buying methods before the season opened; similarly, for the first time, cotton seed storage and distribution was organized by the Marketing Officer in some districts with consequent benefit to all concerned. Nyanza Province maize created a major marketing problem, due to lack of storage facilities and inadequate transport.

In the Central Province the Produce Inspection service was mainly concerned with the wattle crop, and little trouble was experienced. The four Marketing Officers gave close attention to methods of organization and disposal at the producers' end which proved most beneficial. In the Coast Province, draft legislation was prepared for the marketing, inspection and improvement of produce in general, and of cashew nuts in particular. Cotton, under the Kenya Cotton Rules, was the only produce to receive organized Inspection service during the year and, together with cashew nuts and copra, came under organized marketing arrangements. Buying facilities were greatly improved. At the end of the year a Marketing Officer was posted to the Province. This step towards improved marketing will, it is hoped, be the forerunner of the beneficial organization in operation in other areas.

Co-operative marketing in various areas made further progress, and the benefits of this movement are being appreciated to a far greater extent.

**Library**

Some 270 new books were purchased during the year and the following new periodicals were added to those already taken by the Department: "Journal of Soil Science" (Rothamsted), "British Farm Mechanization", "Fibres", "Cordage World", "Australian Journal of Dairy Technology", "Journal of Soil and Water Conservation" (Soil Conservation Society of America) and "World Crops". Nearly three thousand publications were circulated during the year, in addition to those sent to out-stations for retention. There were thirty-four new depositors to the library among the members of the public, but in general slightly less use was made of the Library by the public than in the previous year.

In August a visit was paid to Mombasa to organize the Provincial Library—and in October to Nyeri. Pamphlets were sorted into labelled folders, a card index was made and gaps in sets of periodicals were filled as far as was possible. It is hoped that as a result of discussion with the Provincial Agricultural Officers and the information gained on these visits, really useful provincial libraries will be gradually built up.

**Publications**

The following is the list of articles contributed by Departmental Officers to local journals:—

*East African Agricultural Journal*

VOL. 14—JANUARY–APRIL.

"A Simple Pot Culture Technique for Studying Relative Early Availability of Phosphatic Fertilizers when added to different Soil Types"—G. H. Gethin Jones, Senior Soil Chemist.

"A Note on the Release of Some New Cereal Varieties"—H. C. Thorpe, Senior Plant Breeder.

"The Cutting and Treatment of Seed Potatoes"—R. M. Nattrass, Senior Plant Pathologist.

VOL. 15—JULY–OCTOBER.

"Observations on Palatability of Some Leguminous Plants of Kenya"—A. V. Bogdan, Pasture Research Officer.

"Soil Conservation in the Punjab"—Colin Maher, Senior Soil Conservation Officer (review).

"Mangoes on the East African Coast"—W. R. Sethi, Assistant Agricultural Officer.

*Coffee Board Bulletin*

JANUARY.

"Some Experiments with *Antestia*"—A. R. Melville, Senior Entomologist (Coffee).

APRIL.

"Propagation of Coffee from Cuttings"—E. Cottington, Senior Assistant Agricultural Officer.

JULY.

"Routine Testing to Determine the Population of *Antestia* and *Lygus* in Coffee"—A. R. Melville, Senior Entomologist (Coffee).

SEPTEMBER.

"Field Trials with Coffee in the Trans Nzoia"—P. A. Jones, Agricultural Officer.

DECEMBER.

"Observations on the Life-History and Control of White Borer of Coffee in Kenya"—C. D. Knight, Agricultural Officer (reprint from *East African Agricultural Journal*, 1939).

*The Settler*

"Use of Mechanical Transplanters in Planting Pyrethrum"—E. W. Gaddum, Agricultural Officer (Pyrethrum).

"Release of New Cereal Varieties"—H. C. Thorpe, Senior Plant Breeder.

"Varieties of Cereals to Grow in 1949"—H. C. Thorpe, Senior Plant Breeder.

"Improving Pyrethrum Yields" (four articles)—E. W. Gaddum, Agricultural Officer (Pyrethrum).

"Production of Malting Barley"—H. C. Thorpe, Senior Plant Breeder.

*East African Field, Farm and Garden*

"Cultivation of Citrus Fruits"—T. H. Jackson, Agricultural Officer (Horticulture) and A. C. Howden, Assistant Agricultural Officer (Horticulture).

"Varieties of Cereals to Grow in 1949"—H. C. Thorpe, Senior Plant Breeder.

*K.I.O. Fortnightly*

"Breaking the Dormancy of Deciduous Fruit Trees by Spraying"—T. H. Jackson, Agricultural Officer (Horticulture).

"Maize Seed Selection"—H. C. Thorpe, Senior Plant Breeder.

Other publications by members of the Department which appeared during the year were:—

"Africans and their Land", Books 4–7 (The Problem of Soil Erosion; Forests, Trees and the Farmer; Food and the Farmer; Balanced Farming)—N. Humphrey, Senior Agricultural Officer.

"Aids to Pyrethrum Growing"—E. W. Gaddum, Agricultural Officer (Pyrethrum). Booklet published by the Pyrethrum Board of Kenya.

"A *Botrytis* Disease of *Eucalyptus* in Kenya"—R. M. Nattrass, Senior Plant Pathologist. *Empire Forestry Review*, 28:1:60

"Biological Control of Common Mealy-bug in Kenya, The"—R. Le Pelley, Senior Entomologist and A. R. Melville, Senior Entomologist (Coffee). Paper presented to the 5th Commonwealth Entomological Conference, July, 1948.

"Conservation of Vegetation in East Africa"—D. C. Edwards, Senior Pasture Research Officer. Paper contributed to the International Soil Conservation Conference, Goma, Belgian Congo, November, 1948.

"Use of Pyrethrum on Kenya Coffee Estates"—A. R. Melville, Senior Entomologist (Coffee). *Pyrethrum Post*, Vol. 1, No. 4, 1949.

"Vegetation in Relation to Soil and Water Conservation in East Africa"—D. C. Edwards, Senior Pasture Research Officer. Article contributed to Bulletin 41, Commonwealth Bureau of Pastures and Field Crops.

## AGRICULTURAL LEGISLATION

The following comprise the more important legislative changes affecting agriculture during 1948:—

CONTROL OF GRASS FIRES (AMENDMENT) ORDINANCE.—Doubles the penalties under the Ordinance.

CROP PRODUCTION AND LIVESTOCK (AMENDMENT) ORDINANCE.—Extends the power to make rules to cover the grading of any crop or agricultural produce and regulate, licence and control trading in any crop or agricultural produce.

EUROPEAN AGRICULTURAL SETTLEMENT (AMENDMENT) ORDINANCE.—Section 6 is amended so as to confer on the Member power to purchase land for resale and dispose of surplus assets. As a corollary section 5 is amended so as to provide for the proceeds of such sales to be paid into the fund established under that section. The clauses covering loans are also amended. A new section has been inserted providing that the Limitation Ordinance, 1934, shall not apply to any suit, application or proceeding by the Board. (This Ordinance came into operation on the 19th July, 1949.)

LAND AND WATER PRESERVATION (AMENDMENT) ORDINANCE.—Establishes the power of the Director of Agriculture to declare closed areas and enables rules to be made—requiring Registrar of Titles to register orders made by the Director under the Ordinance against the title of any land concerned.

THE AFRICAN-GROWN COFFEE RULES, 1949.—Part I defines the terms used in the Ordinance, Part II lays down the area where coffee may be grown and the varieties to be grown; prescribes the issues of permits and licences to grow coffee; the conditions on which seed may be obtained; the management and inspection of plantations. Part III deals with purchase and manufacture; prescribes the licensing and inspection of pulping stations, the keeping of accounts and returns, weighing and grading, treatment of infested coffee, etc.

EUROPEAN AGRICULTURAL SETTLEMENT REGULATIONS, 1949.—Land and Agricultural Bank of Kenya appointed to act as agent for the administration of the fund established under section 5 of the Ordinance; form of application and qualifications required laid down; the two approved settlement schemes: A—Tenant Farming Scheme and B—Assisted Ownership Scheme are detailed, as are the general conditions relating to advances.

Other legislation enacted during the year was as follows:—

ORDINANCES.—The Marketing of Native Produce (Amendment) Ordinances. Coffee Industry (Financial Assistance) (Amendment) Ordinances.

RULES AND REGULATIONS.—Agricultural Produce Export Ordinance:—The Castor Seed (Marketing of Bags) Rules, 1949; The Grading of Beans (Amendment) Rules, 1949 (exclusion of soya beans); Grading of Chillies Rules, 1949, and (Amendment) Rules, 1949. Coffee Industry Ordinance:—levy on export; Crop Production and Livestock Ordinance:—Wattle Bark Factory (Amendment) Rules, 1949; Wattle Bark (Improvement and Inspection) Rules, 1949 (lays down periods during which the bark shall not be stripped, purchased or sold).

Emergency Laws:—Control of Hides, Skins and Leather Regulations, 1945: Price; Suspension of certain regulations; Control of Maize Regulations, 1944: movement prohibited; prices; Controlled Produce Regulations: Prices; Cotton Control (Nyanza Province) (Amendment) Regulations, 1949 (amends the regulations to conform with the Lint Marketing Board Ordinance, 1949 (Uganda)); Increased Production of Crops Ordinance, 1942: usual orders; Marketing of Native Produce Ordinance, 1935: Markets; Native Land Trust Ordinance, 1938: Addition to Kikuyu Native Land Unit; Grazing in the Meru District (Amendment Rules, 1949; Kilifi District Grazing Fees Rules, 1949; Native Settlement Areas (Olenguruone) Rules, 1949; Provision of land for National Park; Removal of Common Minerals (Amendment) Rules, 1949, setting apart of land; Passion Fruit Ordinance, 1937: Amendment Rules, 1949; Plant Protection Ordinance, 1937: Amendment Rules, 1949; Pyrethrum (Amendment) Ordinance, 1943: continuation in force; Sale of Wheat Ordinance, 1930: Agency (Amendment) Rules, 1949 (Varieties of wheat to be classified and graded within such classification); Sisal Industry Ordinance, 1945: Rate of cess on fibre; Registration (Amendment) Rules, 1949.

## STAFF

Serious loss was suffered by the resignation of Mr. A. O. Sunman, who joined the Department in 1928, on retirement in October: he had held the post of Assistant Director on several occasions. Mr. R. E. T. Hobbs was promoted to Assistant Director from Provincial Agricultural Officer, Rift Valley, but remained in the Province pending the arrival of Mr. G. Cowley, who took over the provincial duties from him.

Another loss was suffered by the promotion of Mr. P. C. Chambers, Provincial Agricultural Officer, Nyanza, to be Director of Agriculture, Cyprus. Mr. Chambers left Kenya in October, and was succeeded by Mr. J. E. P. Booth on his return from vacation leave.

The Department was very fortunate to secure the services of Mr. G. H. Chaundy, M.B.E., as Principal of the Egerton School of Agriculture, who took over from Mr. Booth when he went on leave. Mr. Chaundy has had a distinguished career in the Education Department and is well known for his agricultural work among the West Suk at Kapenguria.

The general staff position was exceedingly difficult throughout the year, in all sections. The establishment was considerably below strength, while the activities increased, the most serious shortage being of senior officers of the Colonial Agricultural Service. The establishment for technical officers also showed vacancies in every branch, and it is hoped that trained scientists may soon become available. In particular the shortage of chemists and entomologists was severely felt, although one entomologist, Mr. D. J. McCrea was appointed in September.

Recruitment for the Soil Conservation Service continued slowly; one fully qualified Engineer, Mr. E. G. Pike, arrived in September. Twenty-two Assistant Agricultural Officers and Assistant Soil Conservation Officers were appointed during the year. Approval was given to the increase of the permanent and pensionable posts, to a total of 25 Asssistant Agricultural Officers and 14 Assistant Soil Conservation Officers in the Soil Conservation Service establishment.

S. GILLETT,
*Director of Agriculture.*

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